

DESCRIPTIONS OF TWO GADOID FISHES, *PHYCIS CHESTERI* AND
HALOPOKIPHYRUS VIOLA, FROM THE DEEP-SEA FAUNA OF THE
 NORTHWESTERN ATLANTIC.

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Three specimens of an undescribed species of *Phycis* were obtained by the U. S. Fish Commission during the past season. The larger one measured 0.242^m without caudal and two others respectively 0.143^m and 0.128^m. The former is the basis of the following diagnosis; the others being evidently immature and having the characteristics of the species, especially the length of the fin-filaments, less pronounced.

Phycis Chesteri, sp. nov.

Head contained in body (without caudal) $4\frac{1}{3}$ times, height of body 5 times. Diameter of orbit in length of head $3\frac{1}{3}$ times, maxillary twice. Barbel about one-third of diameter of orbit. Vent situated under 12th ray of second dorsal, and equidistant from tip of snout and end of second dorsal. Distance of dorsal fin from snout equal to twice the length of the mandible; the third ray of the first dorsal is extremely elongate, extending to a point (33d ray of second dorsal) two-thirds of the distance from snout to tip of caudal, its length more than twice that of the head, and more than four times as long as the rays immediately preceding and following it. Anal fin inserted immediately behind the vent, its distance from the root of the ventrals equal to that of the dorsal from the snout. As in the other species of the genus,* the ventral is composed of three rays, the first two much prolonged. The first is contained three times in the length of the body, the second is almost three times as long as the head, reaching to the 40th anal ray or $\frac{3}{4}$ of the distance from snout to tip of caudal; the third is shorter than the diameter of the orbit.

The pectoral is four times as long as the operculum. Scales large and thin, easily wrinkling with the folding of the thick loose skin, particularly in the median line of the sides of the body. Lateral line much broken on the posterior half of the body.

Scales 7, 90-91, 28.

Radial formula:—D. 9 or 10, 55 to 57. A. 56. C. 5, 18 to 21, 5. P. 17-18. V. 3.

*A critical study of the ventral fins of *Phycis* compels us to believe that the ventral fin is composed of three rays covered at the base with a thick skin in such manner as to obscure the third, short one, and to join the other two so that they appear like a single bifid ray. In young individuals of *Phycis chuss*, the third ray has its extremity protruding from the sheath, though in adults it becomes entirely enveloped, thus giving rise to the false definitions which have been given for this genus. An adult specimen of *Phycis furcatus*, Flem. (No. 17,371 of the National Museum collection), has the third ventral ray protruding.

Table of Measurements.

| Current number of specimen | 21,840. | 21,841. | 21,842. | | | |
|--|--|---|------------|-------------------------|---------|-------------------------|
| | Trawl 174. | Trawl 194. | Trawl 194. | | | |
| Locality | 42 miles E. & S., Cape Ann, 140 fathoms, Aug. 27, 1878. | 33 miles E. by S., Cape Ann. E. Pt., 110 fathoms, Aug. 31, 1878. | | | | |
| | Millim. | 100ths of length. | Millim. | 100ths of length. | Millim. | 100ths of length. |
| Extreme length (exclusive of caudal) | 242 | ----- | 143 | ----- | 128 | ----- |
| Length to end of middle caudal rays | 280 | ----- | 166 | ----- | 148 | ----- |
| Body: | | | | | | |
| Greatest height | 49 | 20 | 29 | ----- | 23 | ----- |
| Greatest width | 28 | 11½ | ----- | ----- | 20 | ----- |
| Height at ventrals | 39 | 16 | 23 | ----- | 20 | ----- |
| Least height of tail | 9 | 4 | 6 | ----- | 5 | ----- |
| Head: | | | | | | |
| Greatest length | 56 | 23 | 33 | ----- | 30 | ----- |
| Length of barbel | 6 | 2½ | 4 | ----- | ----- | ----- |
| Greatest width | 29 | 11½ | 16 | ----- | 14 | ----- |
| Width of interorbital area | 10 | 4½ | 7 | ----- | 6 | ----- |
| Length of snout | 15 | 6½ | 8 | ----- | 6 | ----- |
| Length of operculum | 13 | 5½ | 8 | ----- | 7 | ----- |
| Length of maxillary | 28 | 11½ | 17 | ----- | 14 | ----- |
| Length of mandible | 32 | 13 | 19 | ----- | 17 | ----- |
| Distance from snout to centre of orbit | 24 | 10 | 14 | ----- | 12 | ----- |
| Diameter of orbit | 17 | 7 | 10 | ----- | 10 | ----- |
| Dorsal (first): | | | | | | |
| Distance from snout | 67 | 27½ | 38 | ----- | 34 | ----- |
| Length of base | 17 | 7 | 10 | ----- | 10 | ----- |
| Length of first ray | 15 | 6½ | 8 | ----- | 8 | ----- |
| Length of second ray | 28 | 11½ | 19 | ----- | 15 | ----- |
| Length of third ray | 117 | 48 | 50 | ----- | 42 | ----- |
| Length of fourth ray | 26 | 10½ | 15 | ----- | 15 | ----- |
| Length of last ray | 3 | 1½ | 15 | ----- | 4 | ----- |
| Dorsal (second): | | | | | | |
| Length of base | 142 | 58 | 88 | ----- | 79 | ----- |
| Length of first ray | 15 | 6½ | ----- | ----- | ----- | ----- |
| Length of longest ray (40th) | 29 | 11½ | 17 | ----- | 15 | ----- |
| Length of last ray | 5 | 2½ | 4 | ----- | ----- | ----- |
| Anal: | | | | | | |
| Distance from snout | 121 | 50 | 64 | ----- | 57 | ----- |
| Length of base | 108 | 44 | 70 | ----- | 64 | ----- |
| Length of first ray | 9 | 4 | ----- | ----- | ----- | ----- |
| Length of longest ray (37th) | 20 | 8½ | 12 | ----- | ----- | ----- |
| Length of last ray | 6 | 2½ | ----- | ----- | ----- | ----- |
| Caudal: | | | | | | |
| Length of middle rays | 38 | 15½ | 23 | ----- | 20 | ----- |
| Length of external rays | 36 | 14½ | 20 | ----- | 17 | ----- |
| Pectoral: | | | | | | |
| Distance from snout | 60 | 12½ | 34 | ----- | 30 | ----- |
| Length | 52 | 21½ | 32 | ----- | 29 | ----- |
| Ventral: | | | | | | |
| Distance from snout | 54 | 22½ | 30 | ----- | 28 | ----- |
| Length of first ray | 96 | 39 | 47 | ----- | 42 | ----- |
| Length of filaments | 165 | 68 | 81 | ----- | 70 | ----- |
| Length of second ray | 15 | 6½ | 10 | ----- | 8 | ----- |
| Branchiostegals | VII | ----- | 7 | ----- | 7 | ----- |
| Dorsal | 9-55 | ----- | 9-57 | ----- | 10-56 | ----- |
| Anal | 47 | ----- | 47 | ----- | 47 | ----- |
| Caudal | 5-18-5 | ----- | 5-21-5 | ----- | 5-21-5 | ----- |
| Pectoral | 17 | ----- | 17 | ----- | 18 | ----- |
| Ventral | 3 | ----- | 3 | ----- | 3 | ----- |
| Number of scales in lateral line | 90 | ----- | ca. 91 | ----- | ca. 90 | ----- |
| Number of transverse rows above lateral line | 7 | ----- | 7 | ----- | 7 | ----- |
| Number of transverse rows below lateral line | 28 | ----- | 23 | ----- | ca. 23 | ----- |

Haloporphyrus viola, sp. nov.

Two specimens of an undescribed species of the genus *Haloporphyrus* of Günther were brought in, August 24, by Captain Joseph W. Collins, of the schooner "Marion" of Gloucester; they were taken on a halibut trawl-line on the outer edge of Le Have Bank, at a depth of four or five

hundred fathoms. A species of this genus was described, under the name *Gadus lepidion*, by Risso,* from Mediterranean specimens. Günther, who referred the species to the new genus *Haloporphyrus* in 1862,† had a specimen from Madeira. Günther published preliminary notices of two species, *H. rostratus* and *H. australis*, in "The Annals and Magazine of Natural History", July, 1878, pp. 18 and 19, which were collected by the Challenger. The affinities of the four known species are indicated below.

Table of Affinities.

| | <i>Haloporphyrus lepidion</i> . | <i>Haloporphyrus viola</i> . |
|--------------------|---|--|
| Head | Contained 4 times in total length (without caudal). | Contained over 4 times in total length (without caudal). |
| Orbit | With diameter $\frac{1}{2}$ length of head | With diameter $\frac{1}{4}$ length of head slightly more. |
| Maxillary | Not extending to the vertical from posterior margin of orbit. | Extending to vertical from posterior margin of orbit. |
| Barbel | Longer than diameter of orbit | Scarcely equal to half diameter of orbit. |
| Vent. | Inserted under 12th ray of second dorsal fin. | Inserted under 19th ray of second dorsal fin. |
| Anal | Inserted directly behind the vent, with slight depression in its middle, and terminating in advance of termination of dorsal. | Inserted behind the vent at a distance equal to length of 2d anal ray, with a considerable depression in its middle, and terminating in a line with termination of dorsal. |
| Pectoral | More than half as long as head | More than four-fifths as long as head. |
| Ventral | Inner ray as long as head, and reaching to the vent. | Inner ray shorter than head ($\frac{1}{2}$) and reaching half way to the vent. |
| Radial formula.... | D. 4, 54; A. 49; V. 6 | D. 4, 53; A. 40; V. 6. |
| Scales | In lateral line, 210 | In lateral line, 115. |
| | Above lateral line, 15 | Above lateral line, 11. |
| Habitat | Madeira | Le Have, 400-500 fathoms. |
| | <i>Haloporphyrus rostratus</i> . | <i>Haloporphyrus australis</i> . |
| Head ..... | ..... | One-fourth of total without caudal; depth of body two-fifths. |
| Anal | Imperfectly divided, approaching, in that respect, the genus <i>Mora</i> . Günther makes this the type of a distinct sub-genus, <i>Antimora</i> . | |
| Radial formula.... | B. VII; D. 4, 51-56; A. 38-39; V. 6. . . | D. 9, 50-52; A. 53; V. 8. |
| Habitat | Deep sea, midway between Cape of Good Hope and Kerguelen's Land; east of the mouth of Rio Plata, 600 and 1,375 fathoms. | Puerto Bueno, Magellan Straits, 55-70 fathoms. |

Description.—Extreme length of type-specimen (No. 21,837, U. S. N. M.) without caudal 0.435^m ($17\frac{1}{2}$ inches), with caudal 0.480^m ; length of collateral type (No. 21,838) without caudal, 0.545^m ; with caudal, 0.603^m . The shape of the body resembles that of the species of the genus *Phycis*, though somewhat shorter, higher, and more compressed, its greatest height contained about five times in its length (without caudal), its height at the ventrals slightly exceeding one-eighth of its total length,

* Ichthyologie de Nice, 1810, p. 118, pl. xi, fig. 40.

† Catalogue of the Acanthopterygii, Pharyngognathi, and Anacanthini in the Collections of the British Museum, 1862, p. 358.

its height at the middle of the caudal peduncle one twenty-ninth of the same.

Scales arranged in about 115 vertical rows and about 38 horizontal ones, about 11 being between the origin of the dorsal and the lateral line and about 27 below the lateral line. Lateral line slightly curved upward in the anterior fourth of its length.

Length of head contained more than four and one-quarter times in that of the body; its width half its length and less than double that of interorbital area.

The barbel is short, its length being scarcely equal to half the diameter of the orbit and about one-tenth the length of the head. The width of interorbital area is about equal to the longitudinal diameter of the orbit, in the larger specimen slightly greater. The diameter of the orbit is equal to or slightly greater than one-fourth the length of the head. The length of the snout is equal to that of the operculum and less than width of interorbital area.

The maxillary extends to vertical from posterior margin of the orbit, its length about equal to the greatest width of the head. Mandible equals one-eighth of total length without caudal.

Snout equal to operculum in length, obtusely pointed, much depressed, its lateral outline subconical, a conspicuous keel extending backward along the lower line of the orbit to its posterior margin. The head and mouth closely resemble those of some species of *Macrurus*, except that the keel is covered with small, smooth scales and is not overhanging. Lips scaleless.

Teeth in the jaws imperfectly serial, villiform, recurved; a small oblong patch of similar teeth on the head of the vomer; none on the palatines.

First dorsal fin inserted at a distance from the snout somewhat greater than twice the height of the body at the ventrals; its first ray is much prolonged, its length greater than that of the head, and nearly as long or longer (in the larger specimen) than the distance from the snout to the beginning of the dorsal. The second ray is contained less than four times, the third six times or less in the first, the fourth about ten times. The length of the base of second dorsal is somewhat more than twice the distance of its insertion from the snout; its greatest height, which is in the posterior fourth of its length (near the 40th ray), is contained about six or seven times in the length of its base.

The vent is situated at a point equidistant from snout and tip of caudal, under the 19th ray of second dorsal fin. The anal fin is inserted at a distance behind it equal to length of second anal ray. Its length of base is slightly more than half that of second dorsal. It has a considerable depression in its middle outline. The last rays of dorsal and anal are of equal length, and are directly opposite each other.

The caudal seems to be somewhat rounded. The length of the middle rays contained more than nine times in total length without caudal, and more than ten times in length including caudal.

Pectorals narrow, inserted under the base of first dorsal. In the smaller specimen they reach to the perpendicular from the ninth ray of the second dorsal, in length equalling the greatest height of the body.

Ventrals inserted at a distance from tip of snout equal to half the length of anal base; the second ray nearly twice as long as the first, and in the smaller specimen, in which it is unmutilated, nearly as long as the head.

Radial formula:—D. 4, 53; A. 40; C. 5, 20 or 21, 5; P. 1, 19; V. 6.

Color.—Deep violet or blue.

Table of Measurements.

| Current number of specimen | 21,837. | | 21,838. | |
|--|-----------------------|-------------------------|---------|-------------------------|
| Locality | Edge of Le Have Bank. | | | |
| | Millim. | 100ths of length. | Millim. | 100ths of length. |
| Extreme length (without caudal) | 435 | ..... | 545 | ..... |
| Length to end of middle caudal rays | 480 | ..... | 603 | ..... |
| Body: | | | | |
| Greatest height | ca. 83 | 19 | ..... | ..... |
| Greatest width | 44 | 10 | ..... | ..... |
| Height at ventrals | 55 | 12½ | ..... | ..... |
| Least height of tail | 15 | 3½ | ..... | ..... |
| Length of caudal peduncle | 19 | 4½ | ..... | ..... |
| Head: | | | | |
| Greatest length | 100 | 23 | 125 | 23 |
| Length of barbel | 10 | 2½ | 13 | 2½ |
| Greatest width | 50 | 11½ | 63 | 11½ |
| Width of interorbital area | 27 | 6½ | 35 | 6½ |
| Length of snout | 25 | 6 | 27 | 5 |
| Length of operculum | 25 | 6 | 27 | 5 |
| Length of maxillary | 49 | 11 | 62 | 11½ |
| Length of mandible | 55 | 12½ | 74 | 13 |
| Distance from snout to centre of orbit | 44 | 10 | 50 | 9½ |
| Diameter of orbit (longitudinal) | 27 | 6½ | 32 | 6 |
| Dorsal (first): | | | | |
| Distance from snout | 113 | 26 | 136 | 25 |
| Length of base | 16 | 4 | 25 | 4½ |
| Length of first ray | 107 | 24½ | 140 | 25½ |
| Length of second ray | 25 | 6 | 33 | 6 |
| Length of third ray | 19 | 4½ | 22 | 4½ |
| Length of fourth ray | 10 | 2½ | 14 | 2½ |
| Dorsal (second): | | | | |
| Length of base | 273 | 62½ | 340 | 62 |
| Distance from snout | 133 | 30½ | 160 | 29 |
| Length of first ray | 27 | 6½ | 33 | 6 |
| Length of longest ray (41st) | 32 | 7½ | 53 | 9½ |
| Length of last ray | 8 | 2 | ..... | ..... |
| Anal: | | | | |
| Distance from snout | 266 | 61 | ..... | ..... |
| Length of base | 142 | 32½ | ..... | ..... |
| Length of first ray | 10 | 2½ | ..... | ..... |
| Length of longest ray (26th) | 35 | 8 | ..... | ..... |
| Length of last ray | 8 | 2 | ..... | ..... |
| Caudal: | | | | |
| Length of middle rays | ca. 45 | 10½ | ca. 58 | 10½ |
| Pectoral: | | | | |
| Distance from snout | 104 | 23½ | 137 | 25 |
| Length | 83 | 19 | 105 | 19 |
| Ventral: | | | | |
| Distance from snout | 71 | 16 | ..... | ..... |
| Length of first ray | 48 | 11 | 52 | 10 |
| Length of second ray | 92 | 21 | ..... | ..... |
| Branchiostegals | | VII | | VII |
| Dorsal | | 4, 53 | | 4, + |
| Anal | | 40 | | 40 |
| Caudal | | 5, 20 or 21, 5 | | |
| Pectoral | | 1, 19 | | 1, 19 |
| Ventral | | 6 | | |
| Number of scales in lateral line | | ca. 115 | | |
| Number of transverse rows above lateral line | | ca. 11 | | |
| Number of transverse rows below lateral line | | ca. 27 | | |